NEWS

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ATS-D LAUNCH SCHEDULED

The National Aeronautics and Space Administration has scheduled an experimental satellite, the ATS-D (ATS-IV in orbit), for launch July 24 from Cape Kennedy.

The 864-lb. spacecraft will be launched into a synchronous orbit about 22,300 statute miles above the Equator at 107 degrees West Longitude over the Pacific Ocean. This will place it about 400 miles west of Quito, Ecuador.

A gravity gradient stabilization system will be the prime experiment of ATS-D. This system makes use of the characteristics of the Earth's gravity to stabilize a spacecraft in orbit.



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The spacecraft also carries a day-night camera experiment. Because the satellite will appear to hover over a single point, and because its attitude is fixed relative to the Earth, the camera will be able to view continually the same area of the Earth. The camera optics are steerable from the ground, thus permitting continuous observation of storm centers and other meteorological features of the Earth's atmosphere.

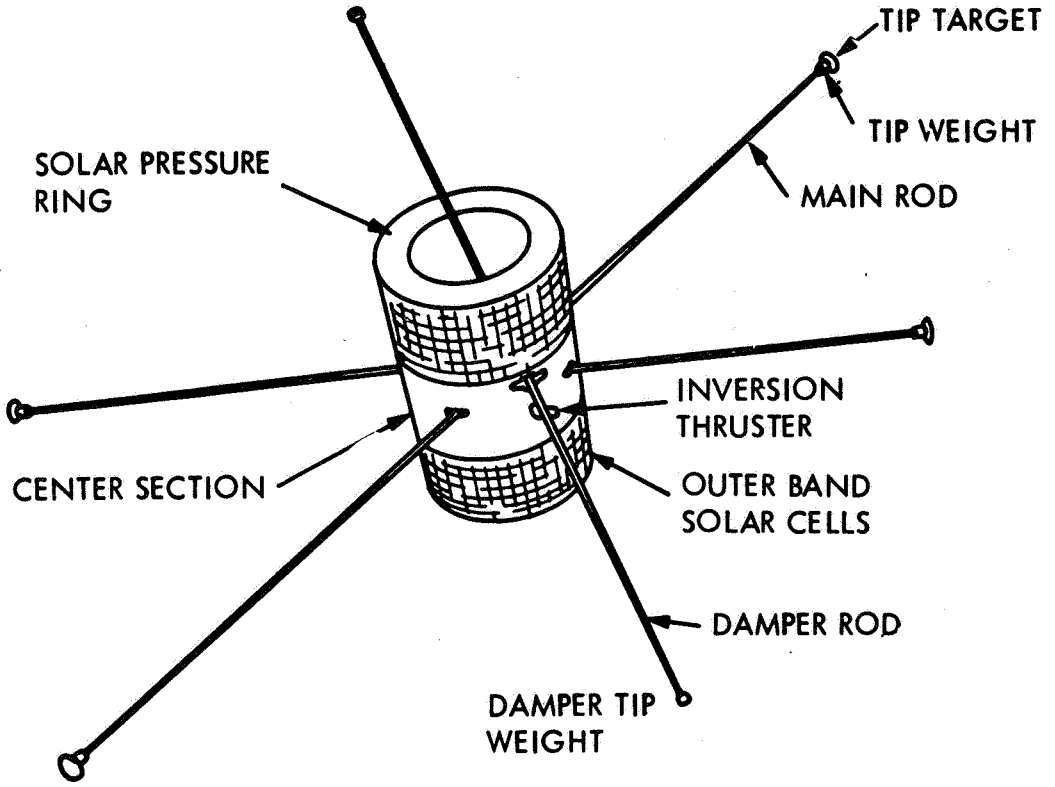
The ATS-D, to be launched by an Atlas-Centaur rocket, also carries a communications experiment and an ion engine experiment. Both of these experiments are designed for use aboard a gravity gradient satellite.

The launch window opens at 6:24 p.m., EDT, Wednesday, July 24, and closes at 7:35 p.m., EDT. The window shifts approximately one minute every other day if a decision is made to launch at a later date.

The objective of the prime mission on ATS-D is to experiment with and determine the performance of a passive gravity gradient control system which uses the Earth's gravity as an anchor for stabilizing the spacecraft in oribt. It is expected to be a long-life, economical technique.

APPLICATIONS TECHNOLOGY SATELLITES

# ATS-D SPACECRAFT

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The concept of the gravity gradient dates back to Sir Isaac Newton in the 16th Century. The Earth's gravity exerts forces deep into space, resulting in the gravity gradient effect. This force can cause an appropriately designed satellite to present its same side continuously toward the Earth.

The Moon is an example of gravity gradient stabilization. One side continually faces Earth. The Moon's shape limits the maximum stabilization effect but it is irregular enough in shape to react to forces exerted by the Earth over millions of years, so it is stabilized with the same side always in view of Earth.

Engineers believe gravity gradient-stabilized satellites will have a longer space lifetime than those without this feature. They are also less expensive than active, three-axis stabilization systems.

The 251-foot thin booms used on ATS-D will tend to bend away from the Sun as the result of solar heating. Earth control stations will be able to observe the extent of this bending effect by the satellite's television camera. The on-board meteorological camera may also be used to see a boom in its field of view which is pointing toward the Earth.

Physicists of NASA's Goddard Space Flight Center, Greenbelt, Md., believe the booms will bend about 12 feet, contributing to an anticipated small spacecraft pointing error. By observing the extent of boom bending, they hope to predict and compensate for the pointing error.

The Image Orthicon Camera (IOC), a day-night sensor, will be orbited for the first time on ATS-D. Infrared photos of the Earth have been taken previously by weather satellites, but night pictures in the visible spectrum (that part of the spectrum which man can see) have not been possible.

The Image Orthicon Camera is a meteorological television camera (885 lines) specifically designed for a synchronous equatorial, gravity gradient stabilized spacecraft.

Each picture made by the camera will cover only a small part of the Earth's visible disk. The area of Earth covered by each individual picture of the equatorial area will be 1,150 statute miles on a side. As a consequence, the camera optics have been made so they can be directed to any point on the Earth disk. Ground resolution will be about two miles at picture center when the optics are aimed near the point directly below the satellite.

The area covered will increase in size for more northerly or southerly areas of the Earth. Sixty-four pictures and three hours would be required to photograph the entire Earth's disk.

Night capabilities of this camera system will be evaluated under various degrees of moonlight, ranging from a quarter to a full Moon.

ATS-D's microwave communications experiment (Super High Frequency) present on all ATS spacecraft to date, has been designed for transmission of voice, television (color and black-and-white), telegraph and digital data to several ground stations.

United States stations for the microwave communications tests are Rosman, N.C.; and Mojave, Calif.

Results from previous microwave communications experiments have shown that several hundred stations could simultaneously transmit and receive voice, television, telegraph and digital data.

The fourth ATS-D experiment is an ion engine being tested aboard a satellite for the first time. This test should determine how well a small ion engine, with a variable-controlled thrust of only 5 to 20 micropounds, (a millionth of a pound) keep ATS precisely on station at 107 degrees West longitude.

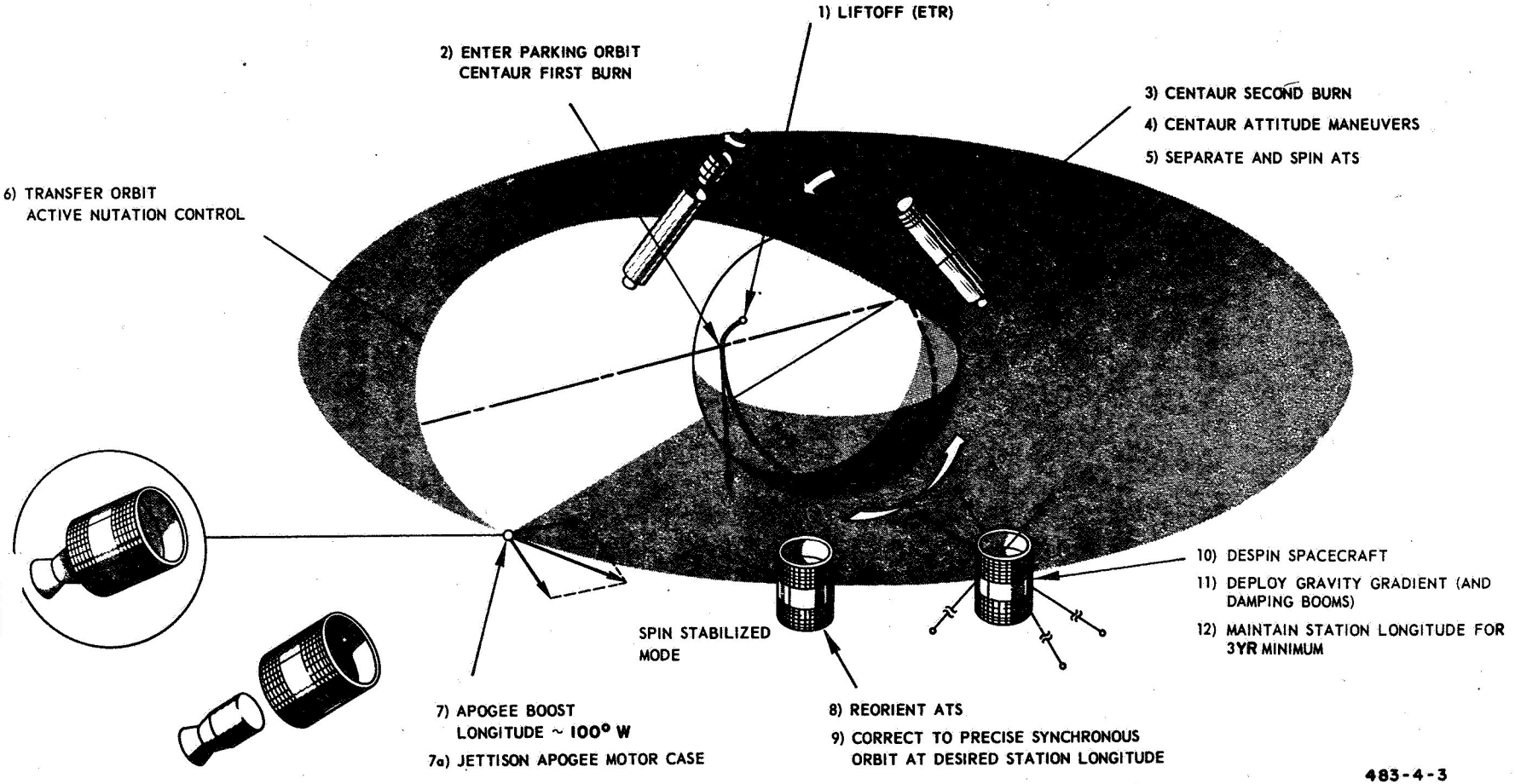


Figure 4-3. ATS-D Orbit Geometry

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ATS-D is the fourth of seven of a series of satellites in the NASA ATS program.

The ATS program is directed by NASA's Office of Space Science and Applications. Project Management is under the direction of NASA's Goddard Space Flight Center.

NASA's Lewis Research Center, Cleveland, is responsible for the Atlas-Centaur launch vehicle. Launch operations are directed by NASA's Unmanned Launch Operations, Kennedy Space Center, Fla.

Hughes Aircraft Co., Culver City, Calif., is responsible for the spacecraft and integration of spacecraft experiments for ATS-A through E. General Electric Co., Missile and Space Division, Valley Forge, Pa., is responsible for the gravity gradient attitude and control system, for ATS-A, D and E.

General Dynamics-Astronautics, San Diego, Calif., is the prime contractor for Atlas-Centaur launch vehicle.

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